GASTROSTOMY, ŒSOPHAGOSTOMY, INTERNAL ŒSOPHAGOTOMY, COMBINED ŒSOPHAGOTOMY, ŒSOPHAGECTOMY, AND RETROGRADE DIVULSION,

IN THE

TREATMENT OF STRICTURE OF THE ŒSOPHAGUS.

BY

SAMUEL W. GROSS, A.M., M.D.,

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IN THE

Treatment of Stricture of the Œsophagus.

The frequency of carcinomatous obstruction of the œsophagus in middle life, and of cicatricial, or fibrous, stricture, particularly in subjects of tender years, to which attention was prominently called by Dr. Henry F. Campbell, at the last meeting of this Association, has led me to collect the somewhat numerous and scattered instances of the various operations which have been practised for their relief, and compare their relative value and disadvantages. To fulfil this object intelligently, carcinomatous and simple strictures will have to be considered separately. In the former, the strength is far more undermined than in the latter, and, as the extension of the disease cannot be arrested, operative interference is only palliative. In simple obstruction, on the other hand, the design is to save as well as to prolong life.

I. Carcinomatous Stricture.—The four operations applicable to carcinomatous stricture are gastrostomy, œsophagos tomy, internal œsophagotomy, and œsophagectomy, of which the first three are palliative, and the last curative.

1. *Gastrostomy*, or the formation of a permanent fistule in the stomach for the purpose of nutrition, has been resorted to at

least 167 times,[1] of which 49 perished as the direct or indirect result of the procedure—21 from peritonitis, 11 from pneumonia, bronchitis, and pleurisy, 10 from shock, 4 from phlegmonous gastritis, 2 from uræmia, and 1 from septicæmia. The mortality may, therefore, be placed at 29.34 per cent., which I find is greater by 14.34 per cent. than that of gastrotomy for foreign bodies, only 3 of 20 examples of the latter operation having proved fatal. Two additional cases succumbed, one from hemorrhage from the growth, and the second from suffocation due to perforation of the trachea by the disease, while 66 died of exhaustion, inanition, or extension of the disease, at periods varying from nine hours to one month, 32 having expired within twenty-four hours. In 14 the second step of the operation was not completed. Of the entire number, 117 died in one month; 4 were living, but how long cannot be determined; and 46 sur-

[1] The operators were Albert in 9 cases; Maydl in 7 cases; Howse in 6 cases; Gerster and Sydney Jones each in 5 cases; Golding-Bird and Whitehead each in 4 cases; Bryant, Knie, Kocher, and Schönborn each in 3 cases; Bartleet, Gould, S. W. Gross, Lücke, MacCormac, Marsh, Mason, McGill, Reeves, Rose, Sédillot, Sklifosovski, and Trendelenberg each in 2 cases; and Anders, Anger, Annandale, Berger, Buchanan, Bugantz, Butlin, Callender, Clark, Courvoisier, Croly, Curling, Davies-Colley, Duncan, Durham, Eddowes, Edmunds, Elias, Escher, Fagan, Fenger, Forster, Fowler, Fox, Green, Gritti, Heath, Hjort, Hueter, Hulke, Hume, Jackson Jacobi, Jacobson, Jessop, Jolly, Kappeler, Kitaevsky, Kraske, Krönlein, Kuester, Langenbeck, Langenbuch, Langton, Lannelongue, Lauenstein, Le Fort, Leisrink, Littlewood, Lowe, Lutz, Mackenzie, Marshall, McCarthy, Menocal, Montgomery, Moore, Morris, Nicholson, F. Page, H. W. Page, Parker, Pepper, Prewitt, Puzey, Pye-Smith, Reid, Richter, Riesel, Rochelt, Rudall, Rupprecht, Schelkly, Greig Smith, Thomas Smith, Stimson, Studsgaard, Stukowenskoff, Svenssen, Swain, Tay, Terrillon, Tilling, Tillmanns, Troup, Volkmann, Von Thaden, Walker, and Zeissl, each in 1 case. A number of these cases have not been recorded in the journals, but have been privately communicated to the author. Great care has been taken to eliminate the names of reporters.

It should be stated that in the two cases of Mason the tonsils were the seat of the disease; that the tonsil and pharynx were affected in one of Whitehead's patients; that the pharynx alone was involved in the case of Parker; and that the pharynx and larynx were carcinomatous in one of Gould's operations. Of these five cases, that of Whitehead was still alive at the expiration of twelve months and nine days, while the remainder proved fatal within ten days—three from exhaustion, and one from peritonitis.

vived longer than one month, the average duration of life, after the stomach was opened, having been thirty-three days.

Of the 46 that lived upwards of one month, 28 expired subsequently—2 in five weeks, 2 in seven weeks, 9 in two months, 2 in two months and a half, 3 in three months, 2 in four months, 2 in five months, 1 in six months, 1 in seven months, 1 in seven months and a half, 2 in eight months, and 1 in ten months. Of the remaining 18, 3 were living at the expiration of one month, 2 at forty days, 4 at two months, 2 at three months and a half, 2 at four months, 1 at five months, 1 at six months, 1 at seven months, 1 at twelve months and nine days, and 1 at thirteen months. The last two cases, the most successful on record, were under the charge of Dr. Walter Whitehead, of Manchester, who was kind enough to write me that the first could not live much longer, while the second was still enjoying excellent health.

2. *Œsophagostomy*, or the establishment of a permanent fistule in the neck for the introduction of food, has been done by Annandale, Billroth, Kappeler, and Weinlechner, each in 2 cases, and by Evans, Holmer, Holmes, Lavacherie, Menzel, Monod, Podrazki, Poinsot, Reeves, Tarenget, Simon, Studsgaard, and Willett, respectively, in 1 case. Of the 21, 4 recovered, and 17, or 80.95 per cent. perished. Of the latter, however, 5 died of exhaustion, and 12 as the result of the operation—7 from shock, 1 from septicæmia, 1 from pyæmia, 1 from pneumonia, 1 from phlegmon of the anterior mediastinum from the penetration of the periœsophageal tissues by the sound, and 1 from penetration of the posterior mediastinum by the tube. Hence, the mortality may be placed at 57.14 per cent. All of the deaths occurred prior to the nineteenth day after the operation, except that from septicæmia, which was delayed for three months. Of the four survivors, 1 lived two months, 1 three months, 1 five months, and 1 sixteen months. The average duration of life for all the cases after the operation was forty-six days; but if the case of Tarenget, which lived sixteen months, be excluded on account of uncertainty as to the true nature of the disease, the average life will be reduced to twenty-nine days.

In connection with œsophagostomy, a danger must be referred to which exerted no little influence on the bad results of the operation. In the case of Holmer, the tube employed for feeding had produced ulceration and perforation of the gullet, and gangrene of the retroœsophageal tissues; in one of the cases of Kappeler, the bougie perforated the œsophagus and lighted up phlegmonous inflammation of the anterior mediastinum, and suppuration of the pericardium; in one of Weinlechner's cases, the tube had entered the posterior mediastinum, in which milk was found after death; while in the case of Willett, an abscess had formed in front of the cricoid cartilage from the use of a No. 14 dilating bougie. In another instance, not included in the above statistics, Annandale, after having opened the œsophagus, was obliged to resort to gastrostomy on account of a second impermeable stricture near the cardia.

3. *Internal Œsophagotomy.*—Internal division of a carcinomatous stricture has only been resorted to once, the operator having been Schiltz. The patient survived about six months, when she died of preëxisting tubercle, five distinct operations, supplemented by methodical dilatation, having been required to keep the tube pervious.

4. *Œsophagectomy.*—In 1877, Czerny resected a small portion of the entire calibre of the œsophagus for a carcinomatous ulcer, and united the lower end of the tube to the wound. Five months subsequently, the woman was in so excellent a general condition, and fed herself so comfortably through the opening, that she would not submit to an operation for uniting the divided ends of the canal. Von Bergmann and Novaro, in 1883, removed, respectively, rather more than an inch and a half, and two inches and a half of the gullet, tracheotomy having also been resorted to on account of impending death from suffocation. The patient of Von Bergmann succumbed within twenty-four hours from suppurative mediastinitis, pericarditis, pleuritis, and pneumonia; while that of Novaro was doing well at the expiration of seven weeks. In another case, Billroth removed the œsophagus from the pharynx to the sternum, along with the entire larynx and thyroid gland. The man was fed through an elastic

tube for four weeks, when the outer wound closed, and bougies were used to effect dilatation of the passage, which was gradually becoming more and more narrow. Towards the end of the sixth week, the bougie entered the periœsophageal tissues, and death ensued three days subsequently from pericarditis and abscess of the posterior mediastinum. Finally, Israel, in a fifth case, extirpated a circular portion of the œsophagus, but his patient perished on the seventh day from necrotic phlegmon of the neck and pneumonia.

In the treatment of carcinomatous obstruction of the gullet, it is almost universally conceded that dilating bougies are not only harmful from the irritation, inflammation, and increased growth of the tumor which they excite, but that their use, even in skilled hands, is liable to be followed by death from perforation of the canal above the seat of the disease, of which accident not a few examples have been recorded. Hence, dilatation may be disregarded as a remedial agent. Within the past four years there has been a tendency to regard surgical interference as unjustifiable as long as nourishment through an elastic tube can be easily practised. In support of this view, I may refer to the five cases reported by Krishaber, Croft, and Durham, in which life was prolonged, on an average, for one hundred and seventy days, a far better result than has been attained by cutting operations. When it is remembered, however, that nine-tenths of all carcinomata are ulcerated, it will be seen that the cases suitable for permanent catheterism of the œsophagus are comparatively few, on account of the ill effects that are liable to follow the retention of a tube. The œsophagus, moreover, is not always pervious to a tube, its passage being frequently impossible, especially when the lesion is deeply seated, as I myself know from the two examples in which I practised gastrostomy. Hence, the method is not generally applicable, and the surgeon is forced to resort to other means of sustaining life.

Of œsophagectomy, little need be said. If the disease were seated high up, in the vicinity of the cricoid cartilage, and the operation were done soon after its commencement, there would be no objection to attempting it as a curative measure; but as

the point mentioned is the one the least frequently affected, and as the disease has generally made considerable progress when the patient is first seen, it is evident that few cases are suitable for the procedure.

Internal œsophagotomy has been done only once, and five operations were required to keep the obstruction open during the six months that the patient survived. Hence, we possess no data upon which to base a positive opinion as to its value: but incision of a carcinomatous obstruction should be condemned on general principles, as it is liable to be followed by ichorous or putrid discharge, hemorrhage, and fungus.

As I have already pointed out, the mortality of œsophagostomy is double that of gastrostomy, the deaths from shock alone being nearly three times as numerous. In addition to the fatality, it does not prolong life as long as opening the stomach, and the patient is exposed to decided risks from the passage of a bougie or tube, which are, for obvious reasons, done away with when the stomach is opened. It is, moreover, open to the objection of affording no information as to the presence of another obstruction farther down, of which occurrence the cases of Annandale and Poinsot are typical examples; and it is, in addition, useless when the carcinoma occupies the lower half of the gullet, as happens in one-half of all instances.

In five of the twenty-one cases in which it was practised, the opening, instead of being made below the obstruction, was made through the tumor in two, and above it in three. The former afford capital illustrations of the danger of incising the growth, as one perished from septicæmia, and the second died with signs of pyæmia. In one of the cases in which the tube was opened above the obstruction, the sound was forced through its walls, from the effects of which the subject died. Even when it is done below the obstruction, the risks and mortality so much exceed those of gastrostomy that it cannot be preferred to the latter operation.

From the preceding considerations, it follows that gastrostomy has proved to be the simplest, most rational, and safest of the four operations for the relief of carcinomatous stricture. In-

creasing experience demonstrates that the results are growing better and better, which cannot be said of œsophagostomy; and there is every reason to believe that the successes will become more numerous if it is resorted to as soon as the diagnosis of the disease has been made, and before the powers of the patient are materially impaired. The procedure itself requires no special skill for its performance, and the subsequent treatment may be entrusted to the patient himself. In not a few cases, by affording rest to the parts, the spasm, swelling, and pain disappear, and the subject is enabled to swallow with comparative ease. The few deaths do not constitute an argument against its adoption; while, in the language of Sir Henry Thompson, used in reference to tumors of the bladder, "every recovery is a clear gain; and a fatal issue is simply the natural termination forestalled."

II. Cicatricial Stricture.—The operations which have been practised for cicatricial stricture are gastrostomy, œsophagostomy, internal œsophagotomy, combined œsophagotomy, and retrograde divulsion.

1. *Gastrostomy.*—The establishment of a gastric fistule has been resorted to 37 times,[1] with 11 deaths as the direct or indirect result of the procedure—7 from peritonitis, 2 from shock, 1 from pyæmia and purulent peritonitis, and 1 from pneumonia, the mortality having been, therefore, 29.72 per cent. One patient died from asphyxia on the fourth day, while drinking water, which passed into a cavity in the lung that was due to its penetration by a tube which had been used for feeding, and 8 perished, at periods varying from thirty hours to twenty-eight days, from exhaustion or starvation. Of the entire number, 20 died within one month, and 17 survived upwards of one month, the average duration of life after the stomach was opened having

[1] The operators were Bryant, Howse, Maydl, Trendelenburg, and Weinlechner, each in 2 cases; and Albert, Bradley, Davies-Colley, Herff, Forster, Jackson, Jones, Jouon, Langenbuch, Langton, Le Dentu, Lucas-Championnière, Maury, Moeller, Pye-Smith, Rupprecht, Sands, Satzenko, Schattauer, Snegireff, Staton, Studsgaard, Stukowenskoff, Tillaux, Tillmanns, Verneuil, and Von Bergmann.

been two hundred and ninety-five days, fourteen hours having been the shortest, and fifty-six months the longest, and the patient being still alive.

Of the 17 survivors for upwards of one month, the precise duration of life is unknown in 1; 9 died subsequently, 1 in two months, 1 in five months and a half, 2 in seven months, 1 in ten months, 1 in eighteen months and a half, 1 in thirty-six months, 1 in forty-two months,[1] and 1 in forty-eight months;[2] and 7 were living, respectively, at the end of four months and a half, five months, eight months and a half, ten months, forty months,[3] fifty-three months,[4] and fifty-six months.[5] All of the strictures were due to the accidental or suicidal swallowing of corrosive fluids, with the exception of one following the cicatrization of a diphtheritic ulcer, and three the result of syphilis.

In the case of Davies-Colley, referred to in the foot-note 4, it will be observed that the fistule was closed at the expiration of about eight months, and that the woman was in good health three years and eight months subsequently. In the case of Howse,[1] the fistule was also closed at the end of twenty months, and death ensued twenty-two months later from the neglect on her part to have bougies passed, the œsophagus being strictured

[1] Case of Mr. Howse, the termination of which is recorded by Dr. Morell Mackenzie in the Amer. Journ. Med. Sciences, April, 1883, p. 436.

[2] Private communication to the author from Dr. Trendelenburg, the operator, who states, in a letter dated Bonn, Dec. 10, 1883, that the boy died four years subsequently from abscess of the brain, the result of scarlatinal caries of the petrous bone. Up to his last illness he was well nourished.

[3] Mr. Bryant writes me, Nov. 30, 1883, in regard to this case, that "her only failing is being too fat."

[4] Mr. N. Davies-Colley informs me that in this case, which was one of syphilitic stricture, the stomach was opened March 22, 1879. On Dec. 2, when she was able to swallow fluids, the opening was closed on account of the pain and excoriation of the skin produced by the escape of the gastric fluids. About Christmas, 1881, she began to take meat, and since then she had been able to swallow solids well, if she took care to masticate them thoroughly. When last seen in August, 1883, she was well nourished. At no time was a bougie used to dilate the stricture.

[5] Case of Dr. A. Herff, of San Antonio, Texas, who informs me that the girl is well, fleshy, and active, and so well contented as to resist attempts at dilatation of the stricture.

from half an inch below the cricoid cartilage to within an inch of the cardia. In a third case, which was living at the end of eight months and a half, Von Bérgmann succeeded in making the stricture, which was near the cardia, permeable, by means of an instrument, the branches of which acted on the obstruction through the œsophagus and the stomach, when the fistule was closed. At the expiration of five months the condition of the patient was excellent.

2. *Œsophagostomy.*—The formation of a cervical fistule has been attempted by Bryk, Horsey, Nicoladoni, Studsgaard, and Zenker. All of the 5 cases were fatal—1 from pyæmia, in six months, the bougie having produced a deep-seated abscess, 2 from shock, within twenty-four hours, 1 from hemorrhage from the internal jugular vein, and septicæmia, on the eighth day, and 1 from exhaustion, on the sixth day. The average duration of life was, therefore, about forty days. In three of the cases the opening was made above, instead of below the stricture.

3. *Internal Œsophagotomy.*—Division of obstruction from within, has been performed by Maisonneuve, in 3 cases; by Dolbeau, Elsberg, and Roe each in 2 cases, and by Czerny, Demons, Lannelongue, Mackenzie, Tillaux, Trélat, Sands, Schiltz, and Studsgaard, each in 1 case. Of the 18, 6, or 33.33 per cent., perished within sixteen days—2 from peritonitis, 2 from entire division of the œsophagus, 1 from hemorrhage, and 1 from pleuritis, the result of perforation of the pleural cavity by the œsophagotome. The average duration of life was two hundred and forty-six days. Of the 12 survivors, 3 are noted merely as having recovered, while 9 were alive, respectively, at the expiration of one month, six weeks, nearly three months, three months, five months, eight months, twelve months, fourteen months, and almost seven years. Six cases required more than one operation—two in three, three in one, six in one, and seven in one.

4. *Combined Œsophagotomy.*—In order that he might attack successfully, and with safety, a deep-seated stricture, Ogston, of Aberdeen, opened the gullet by an external incision, as in ordinary œsophagotomy, and divided the stricture on a grooved

director. The patient was fed by an elastic tube passed through the nose into the stomach, until the eighth day, when a No. 17 English bougie was employed to dilate the parts. Deglutition soon became easy, but death ensued on the sixteenth day, from hemorrhage from the common carotid artery, which was supposed to have arisen from the chafing of the silver sutures which were used to approximate the edges of the wound.

Gussenbauer successfully performed a similar operation in two cases. In the first, that of a child, a permeable stricture behind the cricoid cartilage, and one just above the cardia, which had been impermeable for several days, were divided on a director with a herniotome, the incision of the latter having been greatly facilitated by stretching the œsophageal mucous membrane. The child was fed through a tube passed through the wound for the first week, and afterwards through the mouth. The external wound closed in thirty-five days, when dilating bougies were employed, so that, at the end of one year, a No. 30 passed easily, and solid food was readily swallowed. In the second case, that of an adult woman, a long stricture, commencing at the cricoid cartilage, was divided; a No. 24 elastic tube was passed through the wound for the purpose of feeding, and retained for five days, after which she was fed through a large tube introduced through the mouth, and the wound had closed in twenty-four days. She returned in three months, having failed to pass instruments, and the operation was repeated. She was discharged in three months, but returned one year subsequently, with the same degree of contraction, from neglect to keep up dilatation, when the stricture was gradually dilated to twelve millimetres.

Von Bergmann did a similar operation on an adult, the stricture being seated opposite the third ring of the trachea. The patient was fed through a catheter introduced through the mouth; the opening in the neck closed in five weeks; and at the expiration of three months after the operation, the largest-sized bougie could be easily passed.

Finally, Sands, quite recently, lost a child, two years of age, from exhaustion in less than forty-eight hours.

5. *Retrograde Divulsion.*—On the 24th of October, 1883, Loreta, of Bologna, in a case of impermeable stricture of the lower third of the œsophagus of a man twenty-four years of age, opened the stomach, passed a divulsor through the cardia into the coarctation, and ruptured the latter to what was regarded to be a sufficient extent to admit of the passage of food, when the wounds in the stomach and belly were closed with sutures. In a second case of a similar nature, occurring a few days later in a woman twenty-six years of age, the same operation was resorted to. At the expiration of three weeks, the condition of both patients was reported to be most satisfactory, but there is no notice in the report of the employment of bougies to keep the strictures open. On the 15th of March, 1884, Loreta did a third operation for a coarctation at the cardia, and the woman was living at the expiration of twenty-five days.

Dilatation, which is regarded by many surgeons as the safest mode of managing cicatricial strictures, is, at the best, merely a palliative remedy. It is frequently not successful, and, under all circumstances, has to be continued as long as the patient lives. The passage of bougies, even in skilled hands, is frequently attended with the worst results. In two cases recorded by Sands, an abscess was caused, of which one proved fatal from perforation of the gullet, and the latter accident happened to Démarquay and Billroth. Mere overstretching, indeed, is likewise dangerous, as in a case reported by Billroth death ensued from mediastinitis and pleuritis. In unskilled hands, the indiscriminate use of bougies has frequently been followed by fatal consequences, and they should only be employed by experienced surgeons. If the coarctation be impermeable, one of the five operations, the results of which have just been given, will, of course, have to be resorted to.

Divulsion through an opening in the stomach would seem to be the only recourse in impassable stricture seated near the cardia of the adult. Sufficient time has not, however, elapsed in the three cases of Loreta to test the value of the procedure, so that it does not demand further consideration.

Combined œsophagotomy for strictures near the cardia is only applicable to children, as the distance from the mouth to the cardia is not more than four inches and three-quarters. Gussenbauer's first case, which has yielded the best results, shows that the operation is a failure with regard to dispensing with the subsequent use of bougies, and his second case also failed, as recontraction ensued after both operations, and he had finally to keep the coarctation patulous with the bougie. Von Bergmann's case may pursue the same course, as it was recorded only three months after the operation. Albert and Sands had to abandon the procedure for gastrostomy from the impossibility of detecting the opening in the stricture. The mortality of the procedure is 40 per cent., and it failed in 28.57 per cent. of all the instances in which it has been attempted. It has, however, succeeded in prolonging life for one hundred and sixty-eight days, on an average, and should not be rejected, as it may prove of value in strictures impassable by instruments introduced through the mouth.

Internal œsophagotomy yields a mortality of 33.33 per cent., and an average duration of life of two hundred and forty-six days, as against a mortality of 29.72 per cent., and an average life of two hundred and ninety-five days for gastrostomy. Hence, it is more frequently fatal than the latter procedure, and less beneficial in its ultimate effects. It, moreover, exposes the subject to certain risks which are not met with in opening the stomach. Thus, of the 18 cases, there was severe hemorrhage in 2, of which 1 proved fatal; in 1 death ensued from penetrating the pleural cavity with the œsophagotome; while in 2 the gullet was completely divided, and the patients succumbed, respectively, from abscess of the periœsophageal tissues and the posterior mediastinum, and pneumonia. In one-third of all cases, the operation had to be repeated, and unless the bougie be passed faithfully and methodically, recontraction will be sure to ensue. It is not adapted to strictures near the cardia, nor to impassable strictures in any portion of the tube. If performed at all, it should be reserved for comparatively recent and short strictures, especially if they be not deeply seated; and it should

be remembered that great care, patience, and dexterity will be demanded from the surgeon.

Œsophagostomy is only applicable when the incision can be made below the obstruction, on which account it can rarely be resorted to, even if it be deemed desirable. In 3 of the 5 cases in which it has been done, the opening was made above the stricture, and in 2 others, in which it was attempted by Maydl and Annandale, it had to be abandoned for gastrostomy, on account, respectively, of the density of the coarctation and the presence of a second stricture near the cardia. In addition to these disadvantages, it certainly cannot be claimed that a permanent opening in the neck is preferable to one in the stomach, while the gloomy record of death in every case in which it has been performed offers little encouragement for its repetition.

Gastrostomy is less fatal, and prolongs life longer, than the other operations for cicatricial stricture. Thus, 31 cases of œsophagostomy, internal œsophagotomy, combined œsophagotomy, and retrograde divulsion have afforded 13 deaths, a mortality of 41.93 per cent., and an average prolongation of life of 181 days; while 37 gastrostomies have yielded 11 deaths—a mortality of 29.72 per cent., and an average life of 295 days. In 2, or 10.5 per cent., of the recoveries, the rest given to the parts admitted of the closure of the gastric fistule, while in 1 the fistule was closed after the stricture near the cardia had been rendered permeable through the stomach. Among other advantages, it does not leave an opening in the neck, and it does away with the passage of instruments and the risks of laceration and division of the œsophagus, with the consequent dangers from hemorrhage, emphysema, and pericœsophageal, mediastinal, and pleuritic abscesses. In view of all these facts, opening the stomach must be regarded as the best and safest operation for simple stricture of the œsophagus; and it becomes a serious question whether Maydl is not right in advising its immediate performance when caustic fluids have been swallowed. In addition to the shock, the great dangers in these cases are starvation and the irritation produced by the passage of bougies. The opening in the stomach will not only afford us a ready means

of allaying the pangs of thirst and hunger, and of preventing the emaciation and exhaustion which are so prominent for the first six weeks, but it will also keep the inflamed parts at rest from the contact of food, and bougies, which only increase the swelling and spasm, through which deglutition is rendered painful and frequently impracticable. More than this, it will avert the danger of perforating the softened coats of the gullet. When the resulting sore begins to heal, bougies can be resorted to with safety, and the gastric fistule can be closed.

Cicatricial Stricture in Children.—The management of cicatricial constriction of the œsophagus of infants and children becomes one of great importance in view of the fact, pointed out by Dr. Campbell at the last meeting of the Association, that cases are frequently met with in subjects of tender years from swallowing solutions of "concentrated lye," which are carelessly left in exposed situations. Of the nineteen cases referred to in the paper, four proved promptly fatal from œdema of the glottis, three were not followed by ill-effects, and one had serious trouble; of six not subjected to dilatation, five died at periods varying from five weeks to fifteen months, and the subsequent history was unknown in one; and of five that were dilated, one died of starvation in twenty months, two are merely noted as having recovered, one was well a year subsequently, and one was living nearly six years afterwards, with occasional attacks of choking.

From the great difficulty of managing such cases by dilatation, which is due partly to the struggles of the subjects, and partly to the disinclination of the parents to distress the child, my own opinion is that the suggestion of Maydl should be enforced, and that dilatation should be resorted to only when the inflammation has subsided, and the denuded surface is in a granulating condition. When the constriction is of some standing, and efforts at dilatation prove fruitless, gastrostomy will prove to be the safest and most beneficial operation for prolonging life.

I have collated 22 operations for cicatricial stricture in children, varying in age from nine months to thirteen years, which

demonstrate the truth of this statement. Of 4 œsophagostomies done by Horsey, Nicoladoni, Studsgaard, and Zenker, all died within eight days; of 3 internal œsophagotomies, the cases of Sands and Roe were living, respectively, at the end of three and five months, seven operations having been practised in the first case and six in the second, while the patient of Czerny died from complete division of the tube on the sixteenth day. The case of combined œsophagotomy of Gussenbauer was alive at the end one year, while that of Sands died within forty-eight hours. Of these 9 cases, 6, or 66.6 per cent., died, and the average duration of life was seventy-one days. Of 13 gastrostomies, in the hands of Albert, Forster, Herff,[1] Howse,[1] Jouon, Langenbuch, Langton, Rupprecht, Sands, Schattauer, Staton,[1] Tillmanns, and Trendelenburg, 5, or 38.46 per cent., died, while the average life was three hundred and thirty-three days, Staton's being alive at the end of five months, Albert's at the expiration of five months and a half, Schattauer's at the end of ten months, and Herff's at the end of fifty-six months. In the case of Shattauer, which was one of two strictures, an obstruction at the cardia was dilated through the stomach, and the patient, a girl of twelve, learned to pass a No. 24 bougie through both coarctations. Of the remaining cases, Howse's perished of general tuberculosis in two months; Rupprecht's, of pulmonary phthisis, in seven months; Langenbuch's, of catarrhal pneumonia, in eight months; and Trendelenburg's, of abscess of the brain, the result of caries of the petrous bone following scarlet fever, in four years.

In the preceding paragraphs I have endeavored to examine the subject of operative interference in carcinomatous and cicatricial strictures of the œsophagus in a judicial and impartial spirit; and in arriving at the general conclusion that gastrostomy is at once the easiest, safest, and most permanently beneficial of all the procedures that I have mentioned, I desire it to be understood that this opinion is based solely upon the results, and not upon a preconceived favorable opinion.

[1] Private letters from the operators to the author.

With the view to render the statistics of œsophagostomy and gastrostomy more complete, it may not be out of place to add that these operations have been performed in at least nine additional examples for obstruction of the œsophagus, mainly from extrinsic causes. Thus, œsophagostomy was done twice by Bruns—once for compression by an enlarged thyroid gland, which proved fatal on the tenth day from purulent infection, and once for the same lesion, with the addition of gangrenous periœsophageal abscess, death having ensued from pulmonary phthisis in five weeks; once by Cohen, for syphilitic stenosis of the pharynx, with death in less than twenty-four hours from the penetration of the posterior mediastinum by the tube used for feeding; once by Hadlich, for thickened cricoid cartilage, the patient having survived thirteen months; once by Packard, for carcinoma of the larynx, with death from exhaustion on the fourth day; and once by Watson, for tubercular stricture, the patient having lived two months, when he succumbed from œdema of the glottis. The additional cases of gastrostomy are those of Putzelt and Pinto for compression exerted by enlarged and caseous bronchial glands, of which the former lived fifty-five days, and the latter expired in eight days from passive congestion of the lungs, and that of Cérenville and Dupont for an impassable stricture of a doubtful nature, but which recovered and was being utilized for experiments on digestion.

From the preceding facts we obtain the following results in regard to operative interference for obstruction of the œsophagus from all causes:—

207 gastrostomies have afforded 61 deaths as the result of the procedure, being a mortality of 29.47 per cent., and had prolonged life for 82 days, on an average, at the date of the last reports.

32 œsophagostomies have yielded 19 deaths, a mortality of 59.37 per cent., with a mean life of 52 days.

19 internal œsophagotomies indicate 6 deaths, or a mortality of 31.57 per cent., and an average life of 256 days.

5 combined œsophagotomies have resulted in 2 deaths, a mortality of 40 per cent., and a mean life of 168 days.

5 œsophagectomies have afforded 3 deaths, a mortality of 60 per cent., and an average life of 50 days.

3 retrograde divulsions show a mean life of 22 days, all having been successful.

Hence, 271 examples of operative interference have yielded 91 deaths, or a mortality of 33.58 per cent., and an average prolongation of life of 90 days.